DOCUMENT RESUME

ED 353 542 CS 011 143

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TITLE The Effects of Text Structure on Fifth Graders' Comprehension.
PUB DATE 4 Dec 92
NOTE 10p.; Paper presented at the Annual Meeting of the National Reading Conference (42nd, San Antonio, TX, December 2-5, 1992).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Content Area Reading; *Elementary School Students; Grade 5; Intermediate Grades; *Reading Comprehension; Reading Research; Science Instruction; *Text Structure
IDENTIFIERS California (South)

ABSTRACT

A study determined the effect of three types of text structures (attribution, comparison, and collection) on fifth graders' reading comprehension. Subjects, 71 students from 3 classrooms in 1 public elementary school in southern California, were randomly assigned to 1 of those 3 conditions. There was no instruction given. Students read oceanography essays for approximately 20 minutes per day over the course of a week and a half. At the end of the reading sessions, students took a comprehension posttest. Two weeks later the same posttest was administered to assess retention effects. Results indicate a significant interaction effect for time of measurement by treatment. Univariate follow-up tests indicated that the collection group significantly outscored the comparison group on the immediate posttest. There were no significant differences among the groups at the delayed posttest. A follow-up study done with sixth graders (to assess the impact of the effect of a crude drawing in the text read by one group) attained similar results. (One table and one figure of data are included.) (Author/RS)

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THE EFFECTS OF TEXT STRUCTURE ON FIFTH GRADERS' COMPREHENSION

Presented at the National Reading Conference

San Antonio, Texas

December 4, 1992

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CSC 11143

ABSTRACT

The purpose of this study was to determine the effect of three types of text structures on fifth graders' comprehension. The three text structures were attribution, comparison, and collection. Seventy one students from three classrooms in one public elementary school in southern California were randomly assigned to one of the three conditions. There was no instruction given. Students read oceanography essays for approximately 20 minutes per day over the course of a week and a half. At the end of the reading sessions, students took a comprehension posttest. Two weeks later the same posttest was administered to assess retention effects. The results indicate a significant interaction effect for time of measurement by treatment. Univariate follow up tests indicate that the collection group significantly outscored the comparison group on the immediate posttest. There were no significant differences among the groups at the delayed posttest.

The Effects of Text Structure on Fifth Graders' Comprehension

Many elementary students struggle in subjects such as science and social studies not because they are unable to decode the texts, but because they are deficient in the cognitive activities that foster internalization of concepts. In other words, many students may know the fundamentals of reading, but are not able to apply their reading skills to gain information from texts. Indeed, they have learned to read, but cannot quite read to learn (Singer & Donlan, 1989). One of the problems native to content instruction is the large quantity of information and conceptual density of the text (Readance, Bean & Baldwin, 1981). Textbooks by their very nature tend to introduce large numbers of unfamiliar concepts, new technical terms, and support details in a highly compressed format (Readance et al.) Indeed, there is a substantial research base that suggests that prior knowledge and the organizational structure of a text are critical factors that influence children's content-area comprehension (Anderson & Pearson, 1984). What if, however, the students all have low prior knowledge of the subject? Will a particular structure help or hinder comprehension? Berkowitz and Taylor (1981) found that their sixth-grade subjects were more likely to use the author's structure if the passage was familiar in content. Brandt (1978), however, contends that high prior knowledge with text content causes students to not use text structure to enhance comprehension. Other findings, however, with children and adolescents indicate no differences in recall across various text structures (Horowitz, 1982, cited by Yochum, 1991). Hassan (1984, cited by Yochum, 1991) suggests that two texts may contain identical ideas, but the meaning constructed from reading these text ideas may vary depending upon the way the text is structured.

Interestingly, Schnotz (1984) found no differences in subjects' total recall between comparison and attribution structures. He did, however, find evidence to suggest that the structure of the text could have a differential effect on the recall of specific ideas. This study was done with college students and has not been verified with younger children.

The following project was undertaken to determine if there are differences in comprehension among students with low prior knowledge of a subject on three different text structures. No instruction in formats was given before or during the study.

Purpose

The following text structure study was conducted to determine if comprehension in content areas like science can be facilitated by reading one of three types of expository text design: **attribution** (describing characteristics), **comparison** (similarities and differences in characteristics), and **collection** (ordering of elements; listing and/or enumerating characteristics). These formats were selected because they are the more common organization patterns familiar to children (Yochum, 1991; Richgels, McGee, Lomax, & Sheard, 1987). More specifically, I wanted to see if there were any significant differences among the mean scores of three groups of fifth graders on two posttest of comprehension--immediate and delayed treatment.

Description of Subjects

Seventy-one fifth grade students, 40 boys and 31 girls, drawn from three classrooms in a public elementary school in south Orange County, California, participated in this study. The subjects ranged in age from 9 years 11 months to 11 years 4 months, and in overall abilities from low to gifted. The students were predominantly caucasion; 10 were Spanish surnamed, 4 were Asian, and 1 was black. Most students came from middle class backgrounds and all were fluent in English.

Test of Prior Knowledge

From class lists provided by the three teachers, students were randomly assigned to one of three conditions: an attribution group, a comparison group, or a collection group. This investigator drew numbers from an envelope and matched them with student names on the class lists. Next, a "test of prior knowledge" was individually administered by each teacher using a prepared script to insure uniformity and equalization of groups. This test consisted of six multiple choice questions about the oceanography content that the subjects would subsequently read. Letter "d" in each set of answers was "I don't know" to discourage the students from guessing. Indeed, students were told not to guess and that "I don't know" was, in fact, an acceptable response. Students' scores on this measure ranged from 0-4 with most

scoring between 0 and 2.

Materials

A science activity book called Scientific Encounters of the Mysterious Sea (Embry, 1987) was selected as the instrument for this study because of the high interest level of its individual selections about unusual creatures who live in the ocean. All students were exposed to identical content information on the following animals: barberfish, comb jelly, croaker, electric ray, sea snake, and stonefish. Each daily selection was approximately 700-800 words.

Procedure

Two days after the prior knowledge test was given, the students began their group readings. Each group silently read about two animals per day over a three day period. Selections were randomly counterbalanced to avoid an order effect. Students were told to read each selection at least twice and to try to remember as much as they could about each creature. In addition, they were encouraged to underline, highlight, and to make notes on ideas they perceived as important on the backs of their selections. Each teacher read instructions from a prepared script and allowed students approximately 20 minutes per day to complete the readings.

At the end of the reading sessions, about a week and a half after the prior knowledge test, students took a comprehension posttest (fill in the blank). Approximately two weeks after the comprehension posttest, students again took the same test to assess their content retention.

Attribution Group

These students read selections that had been rewritten by this investigator to conform to an attribution format. This structure is described as one which focuses on characteristics of each animal (Yochum, 1991). Headings and subheadings were used to highlight this structure and the revision was modeled after examples given by Yochum. In addition, all vocabulary words were boldfaced. The print was large, no pictures were used, and each animal's characteristics were dealt with separately.

Comparison Group

This group read selections that had also been rewritten by this investigator. In this version the same text information was organized in such a way as to focus on similarities and differences between the two animals being studied that day. Once again, headings and subheadings were used (Yochum, 1991) and all vocabulary words were boldfaced. The print was large, no pictures were used, and each animal's characteristics were dealt with together (how they were alike and different) within each subheading.

Collection Group

These subjects read selections that had not been altered. These were the original versions straight from the science activity book (Embry, 1987) and seemed to this investigator to follow an expository collection format. A collection text structure includes more than one grouping by association and may include an ordering of elements such as enumeration and sequencing by time (Richgels, McGee, Lomax, & Sheard, 1987). In addition, this version had no headings and subheadings, no vocabulary boldfaced, and smaller print than the others. The one element that it did contain, however, that the others did not was a crude black and white drawing of each creature.

Results

The data were analyzed with a univariate repeated measures analysis of variance using BMDP2V and 7D (1988). This is a 3 (treatment) X 2 (time of measurement) design. The three levels of treatment were attribution, comparison, and collection. The two levels of time of measurement were an immediate posttest (COMP2), and a delayed posttest (COMP3).

Analysis indicate that there were no significant differences among treatment groups at the time of the prior knowledge test [$F(2,68) = 1.31$, $p>0.2758$]

In the analysis of the immediate posttest and the delayed posttest results, there was no overall significant main effect for treatment [$F(2,68)=2.24$, $p>.10$]. However, there was a significant interaction effect for time of measurement by treatment [$F(2,68)=4.50$, $p<0.01$].
Since there were significant interaction effects, follow up univariate tests were conducted. Because only two of these tests were conducted, alpha was kept at .05. Analysis of the immediate posttest results (COMP2) demonstrated a significant effect for treatment by time [$F(2,68)=4.86$, $p<0.01$]. Tukey post hoc procedures were then implemented. Results indicate that there were signifcant differences in treatment between the comparison group and the collection group ($p<.01$). There was no significant difference between the attribution group and the comparison group, and the difference between the attribution and collection groups just approached significance ($p<.10$). Results of the delayed posttest (COMP3) indicated that there were no significant differences for treatment by time among the three groups [$F(2,68)=0.58$, $p>.50$].

Discussion

The main purpose of this study was to determine whether content area comprehension can be enhanced through the use of a particular text structure.

The results demonstrate that the students in the collection group outscored the other two groups and overall showed the most growth after treatment on the immediate posttest. This is the group that read the smaller print, had no headings or subheadings, and had no boldfaced vocabulary words. They did, however, have a crude drawing of the animal about which they were reading at the top or the bottom of the selection. It is possible that the use of a visual is more important to initial comprehension than any one particular type of text structure. Also, it is apparent that some fifth grade students paid no attention to headings, subheadings, and darkened words--all aids designed to enhance comprehension found in both the attribution and comparison texts. Perhaps, students in the collection group outscored the others on the immediate posttest because the collection format seemed more like the narrative structure they are used to reading in both basals and tradebooks. On other hand, when the students took a delayed posttest approximately two weeks later all significant differences in mean scores among the three groups had dissipated. Indeed, the mean score of the collection group dropped from 4.13 to 3.21 while the mean scores of the attribution group and the comparison group remained relatively stable (3.08 to 3.24 and 2.60 to 2.73). How can this be explained? Perhaps it cannot be without further study in this area. It is a perplexity as to why the collection group actually "lost ground" on COMP3 when they had done so well on COMP2. Obviously, the possible positive effects of the visual were not retained. Perhaps it was more the timing of the delayed posttest and the fact that it was the third time in less than a month that students had been asked to complete similar measures. This explanation, however, does not explain why the attribution and comparison groups' scores remained stable. Further research needs to examine the effects of visuals versus organizational aids such as headings and subheadings.

It is important to remember that no instruction occurred in text structure prior to the readings in the study. It is possible that the findings would have been different had some instruction occurred.

Post Script

To assess the effect of the visual, I replicated the study later that same school year with sixth grade subjects using six groups instead of three. The text structures remained constant, but three of the groups had pictures and three groups did not. All content remained the same.

The results of the second study indicate that the visual had no effect on the outcome. There was no treatment effect. None of the six groups, either with or without the visual, performed significantly better than any of the others. However, the collection group with the picture did achieve the highest score on the immediate posttest once again. Also, in this study, time was a significant factor. In other words, there was a significant difference between the scores of the immediate posttest and the delayed posttest.

REFERENCES

Anderson, R. & Pearson, P. (1984). A schema-theoretic view of basic processes in reading. In P. D. Pearson (Ed.), Handbook of reading research (pp. 255-292). New York: Longman.

Berkowitz, S. & Taylor, B. (1981). The effects of text type and familiarity on the nature of information recalled by readers. In M. L. Kamil (Ed.), Directions in reading: Research and instruction (pp. 157-161). Thirtieth Yearbook of the National Reading Conference. Washington, DC: National Reading Conference.

Brandt, D. (1978). Prior knowledge of the author's schema and the comprehension of prose. Unpublished doctoral dissertation, Arizona State University, Tempe, AZ.

Embry, J. (1987). Scientific encounters of the mysterious sea. Moline,IL: Good Apple Publishing Co.

Dixon, W. J. (Ed.). (1988). BMDP. Berkeley: University of California.

Richgels, D., McGee, L., Lomax, R., & Sheard, C. (1987). Awareness of four text structures: Effects on recall of expository text. Reading Research Quarterly, 22, 177-196.

Schnotz, W. (1984). Comparative instructional text. In H. Mandhl, N. Stein, & T. Trabasso (Eds.), Learning and the comprehension of text. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Singer, H. & Donlan, D. (1989). Reading and learning from text. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Yochum, N. (1991). Children's learning from instructional text: The relationship between prior knowledge and text structure. Journal of Reading Behavior, 23, 87-109.

Table 1. Mean scores and standard deviations for prior knowledge test, immediate comprehension posttest (COMP2) and delayed comprehension posttest (COMP3).

	PRIOR KNOWLEDGE	IMMEDIATE	DELAYED
ATTRIBUTION	1.160 (1.160)	3.080 (1.579)	3.240 (1.665)
COMPARISON	1.391 (1.076)	2.609 (1.803)	2.739 (1.864)
COLLECTION	0.870 (1.100)	4.130 (1.714)	3.217 (1.858)
OVERALL	1.141 (1.099)	3.268 (1.789)	3.070 (1.783)

FIGURE 1. MEAN SCORES OF THREE GROUPS ON TEST OF PRIOR KNOWLEDGE, IMMEDIATE COMPREHENSION POSTTEST, AND DELAYED COMPREHENSION POSTTEST.